

ABSTRACT OF THE INVENTION

A detection module and remote load voltage sensor determine a location of a parallel arc for a power circuit between a power source and a load in real time. The detection module provides a value of voltage from the power source. A  
5 current sensor measures a value of current flowing in the power circuit to or from the power source. The remote load voltage sensor measures a value of voltage at the load. A microprocessor determines the parallel arc location from the value of voltage from the power source, the value of current, the value of voltage at the load, and a wire resistance or conductance per unit length of the power circuit. In one case,  
10 connector resistance is accounted for. In another case, the load voltage is encoded at a predetermined frequency using a switched precision resistor near the load, thereby providing a power line carrier type communication.